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SLCET-TR-90-17

EUROPEAN COOPERATIVE PROGRAMS AND THE U.S.

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December 1990

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European cooperative programs are becoming increasingly important relative to those of individual nations. Infrastructures and databases have been developed to manage these programs efficiently. Most of the database information is accessible on-line from the U.S. via telephone and data networks, and active participation by U.S. companies appears imminent. Civilian programs such as EUREKA have been so success-ful that military programs such as EUCLID are being modeled after it.

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INTRODUCTION

The political movement for European unification, which started right after World War II and led to such expressions as the European Economic Community, now the European Community (EC), has brought forth also an increasing collaboration on scientific and technical levels. The principal driver for such cooperation was, foremost, the military threat by the East block countries, followed very closely by the perceived economic threat from the United States and, lately, also from Japan. A third driver was the recognition that R&D investments to counter these threats would have to be so large that no single country alone could be successful. Since most European countries already had a tradition of Government funding for nearly all university basic R&D, it was only natural that mechanisms emerged under which joint programs could be created, in which one research objective was being pursued cooperatively at two or more research organizations across the Continent. In Europe, such Programs are called 'Transnational' programs.

OVERVIEW OF EUROPEAN COOPERATIVE PROGRAMS

European cooperative programs are identified by their sometimes colorful Acronyms (see list on page 6). They consist of national and transnational programs.

European transnational cooperative programs fall roughly into two categories, i.e., those sponsored by the European Community, such as ESPRIT, RACE, BRITE, and COMETT, and by multinational agreements, such as the 16 Nation EUREKA initiative. This paper will describe the origin, scope and methodology of these initiatives.

NATIONAL PROGRAMS

The best known of these is the British Alvey program, named after Lord Alvey, that consisted of a 5 year, $500M program, completed in 1988. It was managed centrally by a directorate. Typically, industry participants did match government funding 1:1, while universities were not required to do so. A database search lists a total of 331 Alvey projects in such fields as microelectronics and computer architecture. A subset of the Alvey program was the $150M VHPIC program for military circuits. As a follow-up to Alvey, the British government instituted LINK, a $640M program directed at molecular electronics, optoelectronics and robotics. On the Continent, the best known programs were the Mega Project between Dutch Philips and West German Siemens from 1983-89, which laid the foundation for JESSI; and the SUPRENUM program funded by the German government.

PROGRAMS BY THE EUROPEAN COMMUNITY

Programs by the 12 nation European Community (EC) (now France, Belgium, The Netherlands, Luxembourg, Italy, West Germany, Denmark, Ireland, Spain, Portugal, United Kingdom and Greece) are administered by the European Commission's Science secretariat, a large organization in Brussels that handles applications for funding and project supervision of approved projects.

One of the first programs sponsored by the EC was the Microelectronics Program (MEL), which started in 1982 and lasted for four years, when it was succeeded by ESPRIT 1 (1984-87 at 1.5B ECU) and now ESPRIT 2 (3.2B ECU). As of 15 April 1990, there were 451 projects listed in ESPRIT databanks.

Another EC program is RACE, a 5 year, $1.5B project to develop an integrated broadband network in Europe. Currently 47 RACE projects are listed, including GaAs R&D.

EUREKA

EUREKA was proposed in April 1985 by French President Mitterand as a European alternative to the U.S. SDI program. However, the program is now entirely civilian and primarily product-oriented, aimed at keeping European nonmilitary technology abreast of the U.S. and Japan. Its focus is to push technologies to marketable products. More than 410 projects are now listed in EUREKA databanks.

EUCLID

After the success of the civilian-oriented EUREKA project, the Independent European Program Group (IEPG), consisting of the defense ministers of all European NATO members except Iceland, launched (at their June 1989 meeting, in Lisbon) a military cooperative program which they called "European Cooperation for Long-term in Defense" (EUCLID). The program is designed to consolidate European Defense R&D requirements and resources, and avoid duplication. The ministers expect that this program will enhance the position of Europe's defense industry, which is perceived to lag behind the United States and even Japan in many areas. Initial funding was set for $120M in 1990. The following topics have been selected for EUCLID:

> Modern Radar Technologies
> Silicon Microelectronics
> Composite Materials and Structures
> Modular Avionics
> Electronic Guns
> Artificial Intelligence
> Signature Manipulation/Processing

Optoelectronic Devices
Satellite Surveillance Technology (including Verification)
Underwater Acoustics
Human Factors/Training Simulators

HOW EUROPEAN PROGRAMS ARE MANAGED

ESPRIT

ESPRIT is by far the most visible of the EC programs and accounts
for roughly 40% of its spending. Member states agree periodically
on a total budget and framework, and EC employees then solicit
proposals, have them peer-reviewed, and award contracts. Half of
the funding is generally borne by the participants. Multinational
participation is required; progress is reviewed at an annual
ESPRIT conference. ESPRIT receives virtually thousands of
proposals per year of which only a fraction obtain funding.

EUREKA

EUREKA was established in July 1985 by treaty among the 12
countries of the European Community, and, in addition, Iceland,
Norway, Finland, Sweden, Austria, Switzerland, Turkey, and as
separate participant, the European Commission. In contrast to
ESPRIT, EUREKA is a bottom-up organization. Anyone having an idea
and a partner can submit a proposal. If he has no partner, he may
find one through the ECHO databank. Projects are to be submitted
to National Coordinators who, in turn, send the projects to a
panel of Senior Representatives for review, for which a maximum
time limit of 45 days is specified. Recommendations are then sent
to a ministers conference for final approval and announcement as
a EUREKA project. All these activities are managed by a very
small Secretariat in Brussels.

Funding of EUREKA projects is different than EC projects, in that
EUREKA does not have a common funding source and each national
organization has to secure its own funds from public or private
sources. Nevertheless, listing as a EUREKA project provides a
powerful endorsement that will facilitate obtaining such funding.

HOW TO ACCESS EUROPEAN COMMUNITY DATABASES

Information on virtually all European cooperative projects can be
obtained on-line through the vast databank of the European
Commission Host Organization (ECHO) in Luxembourg, which provides
detailed program information on European Community projects,
EUREKA, and national programs such as Alvey. ECHO also provides
listings and information on many other public and private
European and United Nations databases.

There are two ways to access ECHO from the United States:

1. Through a data network such as Telenet and Tymnet, connecting to the Luxpac datanet. The ECHO access number is: 270-448-112.

2. Through an overseas telephone call. The PC should be set as follows:

> Full Duplex, 1200 bauds
> Even Parity, 7 Bits, 1 Stop
> Modem set to CCITT Standard

The number to be dialed is 011-352-420-347.

Although the packet network connection is faster at 2400 bauds, it is also more expensive for the occasional user, since large minimum charges are required. We found the telephone access quite reliable. When connection is made, the computer will answer:

> THIS IS ECHO; PLEASE ENTER YOUR CODE

You now enter your password. To obtain access to the full range of the database, you need a password, which can be obtained by registering with ECHO at the following address:

> European Commission Host Organization (ECHO)
> POB 2373
> L-1023 Luxembourg

Registration for most databases is free of charge, except for TED (EC Tenders Daily), which contains requests for bid and contract awards led by the European Community - similar to the American Commerce Business Daily (CBD). TED costs 36 ECU per connect hour.

Even without being registered, it is possible to access some of these databases by using one of the following public passwords:

EUREKA   Full program information on Eureka projects.

TREND   Access to the Trend Monitor database which can be searched for developments in various high tech fields.

DIANE   Access to the Dianeguide database which contains information on access and content of numerous European databases.

TRAINE   Gives information on commands and usage of ECHO.

MATEN   Access to the DOMIS materials database.

JUSE   Access to the JUSLETTER database.

4

CAN FOREIGN FIRMS PARTICIPATE?

With the advent of the Europe 1992 agenda to abolish all trade barriers within the European Community, some concern of European protectionism exists in the U.S. Although European cooperative programs were originally designated to strengthen European vs. U.S. and Japanese technology, cracks have begun to appear and foreign companies have begun to participate as follows:

o An agreement was signed in January 1990 between IBM (USA) and Siemens (Germany) on the common development of a 64-Mb DRAM, which parallels the JESSI goal, and undoubtedly will result in technology transfer between the two organizations.

o European branches of multinational companies are welcome to submit EUREKA proposals.

o Official exchanges between JESSI and U.S. Sematech have resulted in an agreement on two cooperative, albeit nontechnical projects, to analyze U.S. and European industries vs. Japan, and to adopt common semiconductor standards. Negotiations are underway for JESSI to share materials information with Sematech in return for some device processing technology.

o Japanese companies participate in Esprit Projects through their European acquisitions. One example is the British company ICL, which is involved in JESSI and ESPRIT and has been acquired by Fujitsu.

o The European Commissioner for Science and Technology proposed to the U.S. the establishment of a joint permanent task force to monitor and coordinate research.

o A strong discussion is currently underway among EUREKA participants on how to include Eastern Europe into their projects. A similar avenue may be feasible for the U.S.

o It should be noted that project information in ECHO is detailed and provides program information and point of contacts, as well as telephone and FAX numbers for all participants, to facilitate making contacts.

CONCLUSIONS

European cooperative programs gain ever more importance over national programs. Infrastructures and databanks exist to manage these programs efficiently. Most of this information is accessible on-line from the U.S. through telephone and data networks and active participation by U.S. companies appears imminent. Civilian programs such as EUREKA have been so successful that military programs such as EUCLID are being modeled after it.

ACKNOWLEDGMENT

ACRONYMS

ARIA   Automatisation rapide et integree d'assemblage (Assembly Automation)

BRITE   Basic Research in Industrial Technologies for Europe

COMETT   Cooperative Program in Education and Training in Technology

DOMIS   Directory of Materials Data Information Sources

EC   European Community, European Commission

ECU   European Currency Unit (approximately one dollar)

ESPRIT   European Strategic Programme for Research and Development in Information Technology

EUCLID   European Cooperation for the Long Term in Defense

EURAM   European Research on Advanced Materials

EUREKA   European Research Coordinating Agency

EQUATOR   Environment for Qualitative Temporal Reasoning (AI)

FAMOS   Flexible Automated Montage System

ITHACA   Integrated Toolkit for Highly Advanced Computer Applications

JESSI   Joint European Submicron Silicon Initiative

MEL   Microelectronics Program

MISEP   Mutual Information System on Employment Policies

MITHRA   Materiels Intertechnologiques de Haute Robotique (Robotics)

OSCAR   Optical Switching systems, Components and Applications Research

PABLI   Pages Bleues Informatisees

RACE   Research on Advanced Communications in Europe

SUPRENUM   Superrechner fuer Numerische Anwendungen (Supercomputer)

TED   Tenders Electronic Daily

VHPIC   Very High Performance Integrated Circuits

APPENDIX A: LOGIN AND SEARCH FOR JESSI IN ECHO DATABASE

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%   THIS IS ECHO; PLEASE ENTER YOUR CODE
%/EUREKA@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@C@@@@@@@@@@@@@@@@@@@@@
%   JMS0066 OLDSTYLE 90-11-14 15:44 4420
%   CMD0553
BASE COMMAND ACCEPTED FOR ER88;EUREKA;ED=18.11.8F7 TO 05.10.90
?
FIND JESSI/TI
1.00   NUMBER OF HITS IS   1
?
( _S F=ALL
1.00/000001 ECHO: -EUREKA /COPYRIGHT ECHO
CD    : 901004
SO    : EUREKA
RN    : 50127
TI    : (JESSI) JOINT EUROPEAN SUBMICRON SILICON INITIATIVE
PR    : EUREKA 127
AR    : SUBMICRON; SILICON; INFORMATICS


RL    : The JESSI programmes must be seen in relation to the work
        done before in the field of semiconductors at the  Commu-
        nity  level  (ESPRIT  I and II) as well  as  through  bi-
        national  initiatives  (Megaproject  and  EUREKA  EPROM).
        Moreover, JESSI will support the achievements of Applica-
        tions programmes (e.g.  HDTV, CARMINAT, RACE, etc.).


PA    : F.  R.  GERMANY: PHILIPS, VALVO UNTERNEHMENSBEREICH
        F.  R.  GERMANY: ROBERT BOSCH GMBH
        F.  R.  GERMANY: SIEMENS AG
        FRANCE: SGS THOMSON MICROELECTRONICS S.A.
        NETHERLANDS: PHILIPS, NEDERLANDSE PHILIPS BEDRIJVEN N.V.
        (main)
        UK: PLESSEY COMPANY PLC.
        Interest expressed by BELGIUM.


DU    : For the semiconductor makers, the major milestones are:
        - fabrication of the 1st silicon for 0.5 micrometer CMOS
        circuits after two years (end 1990),
        - fabrication of the 1st silicon for 0.3 micrometer CMOS
        circuits after five years (end 1993).
        For the system houses and IC manufacturers, the earliest
        availability of design rules and powerful CAD tools will
        be a main objective of the programme, starting from 1
        micrometer logic technology and going down to 0.7 micro-
        meter in 1990, 0.5 micrometer technology in 1993 and 0.3
        micrometer by 1996.  Furthermore, for the system houses,
        the earliest access to the advanced IC-Technologies de-
        veloped is decisive for their competitiveness.
```

RS : The overall JESSI programme cost is 3800 MECU for 8 years (1989-96).
The 4 sub-programmes will respectively represent 41%, 13%, 32% and 14% of this cost (1550 MECU, 500 MECU, 1200 MECU and 550 MECU). Revised total estimate as at 01.02.90: 550 MECU.

CP : Main project contacts:
Other national contacts:
org : bosch4
contact : GLAUERT
title : DR.
dept : DEPT. K8/DIC 2
function :
tel : +49 71 21 35 2791
telex :
fax :
email :

org : bull3
contact : GRUNDBERG
title : MR.
dept :
function :
tel : +33 1 45 02 94 78
telex :
fax : +33 1 45 02 97 31
email :

org : elekt
contact : H.R. MEYER
title : DR.
dept :
function :
tel : +49 89 92 80 820
telex :
fax : +49 89 92 80 82 12
email :

org : jessihq
contact : VELTMAN
title : PROFESSOR
dept : JESSI PLANNING COUNCIL
function : CHAIRMAN
tel : +49 4821 77 80
telex :
fax : +49 4821 713 90
email :

org : phic
contact : HAZEWINDUS

```
title : DR.
dept :
function : MAIN CONTACT
tel : +31 40 78 37 36
telex :
fax :
email :

org : phic18
contact : H.  WEINERTH
title : DR.
dept :
function :
tel : +49 40 32 96 501
telex :
fax :
email :

org : plessw
contact : LARKIN
title : DR.
dept : ENGINEERING & COMPONENTS DIVISION
function :
tel : +44 79 35 18 240
telex :
fax :
email :

org : rtc
contact : DE LA CHAPELLE
title : MR.
dept :
function :
tel :
telex :
fax :
email :

org : siem4
contact : MEYER
title : DR.
dept : GESCHAEFTSBEREICH HALBLEITER
function :
tel : +49 89 63 64 43 80
telex :
fax :
email :

org : thom11
contact : JEAN-CLAUDE VASUTH
title : MR.
dept : ETUDES ET PROGRAMMES
```

function : DIRECTEUR DU PLAN
tel : +33 1 47 40 77 23
telex :
fax : +33 1 47 40 79 10
email :

org : thom14
contact : ZOCCHI
title : ING.
dept : CENTRAL RESEARCH & DEVELOPMENT
function : DIRECTOR
tel : +39 39 655 51
telex :
fax : +39 39 655 53 00
email :

AB   : Project description
JESSI is an 8 year research and development programme on
silicon-based microelectronics and its integration into
systems. The definition phase for the JESSI programme
started on 1st January 1988 and ended on 31st December,
1988. This document deals with the JESSI execution phase
programme   which consists of 4   inter-related   sub-
programmes:
Technology, Equipment and Materials and Basic and Long
Term Research.
During the Definition Phase, people from 29 institutions
and companies from 6 European countries (BELGIUM, FRANCE,
F. R. GERMANY, ITALY, the NETHERLANDS and the UNITED
KINGDOM) worked together to define the "Green Book" of
JESSI. The Executive Outline of this green Book is
available.   It is forecasted that most of   these
institutions and companies will participate in   the
Execution Phase.

Developments
1. Technology:
- development of submicron memory technologies (down to
0.3 micron =DRAM, SRAM, EPROM)
- development of logic technologies starting from today's
1 micron, using first the results obtained on memory
technologies, and adding some options (e.g.   BICMOS,
E2PROM)
- access to state-of-the-art processes for special
circuit designs where performance and delivery schedules
are more important than volumes.
- manufacturing engineering methods to assure timely and
cost   efficient   production of present   and   future
integrated circuit on 150 and 200 mm wafers.

2. Equipment and materials:
This JESSI programme sub-programme aims at:

- developing equipment and materials fulfilling the technological requirements for the production of memory and logic circuits defined in 1.

- building a solid base of European equipment manufacturers in selected areas.

3. Application:
The CAD tools and Euro-project objectives are:

- build up new design methodology and tools for the development of complex ICs (e.g. systems on a chip) and link to systems houses'system tools, by adding new tools which fill the gap between high end and existing low end IC design tools, independently of P.C., hybrid or IC implementation.
- develop prototypes of microelectronic systems (Euro-projects), serving as test vehicles for the JESSI CAD environment and the JESSI technologies, together aiming at validation of new system architectures.

4. Basic and Long Term Research:
This sub-programme goals are:
- to support the IC manufacturers in reaching their goal of 0.3 micron structure width, 10 e7 - 10 e8 transistor complexity in pilot production for 1996 and beyond.
- assure long-term continuity by developing new methods and technologies to be exploited after 1996.

```
OS      : name : BELGIUM
          org : b
          add1 :
          add2 :
          city :
          zip : B -
          cntry : BELGIUM
          tel :
          telex :
          fax :

          name : PHILIPS NEDERLANDSE PHILIPS BEDRIJVEN NV
          org : phic13
          add1 : (POB 80000)
          add2 :
          city : EINDHOVEN
          zip : NL - 5600 JA
          cntry : NETHERLANDS
          tel :
          telex :
          fax :

          name : PHILIPS, VALVO UNTERNEHMENSBEREICH
```

```
org : phic18
add1 : BAUELEMENTE
add2 : BURCHARDSTRASSE, 19
city : HAMBURG 1
zip : D - 2000
cntry : GERMANY
tel :
telex :
fax :

name : PLESSEY COMPANY PLC
org : plesex
add1 : VICARAGE LANE
add2 :
city : ILFORD (ESSEX)
zip : G - IG1 4AQ
cntry : UNITED KINGDOM
tel :
telex :
fax :

name : ROBERT BOSCH GMBH
org : bosch5
add1 : (POB 106050)
add2 :
city : STUTTGART 10
zip : D - 7000
cntry : GERMANY
tel :
telex :
fax :

name : SGS THOMSON MICROELECTRONICS S.A.
org : thom11
add1 : 7, AVENUE GALIENI
add2 :
city : GENTILLY CEDEX
zip : F - 942 50
cntry : FRANCE
tel : +33 1 47 40 75 75

telex : 63 25 70 STMHQ F
fax : +33 1 47 41 38 44

name : SGS-THOMSON MICROELECTRONICS S.A.
org : thom14
add1 : (POB 3651 - MILANO)
add2 : VIA C.  OLIVETTI, 2
city : AGRATE BRIANZA (MILANO)
zip : I - 200 41
cntry : ITALY
tel : +39 39 655 51
```

```
telex : 330 13 SGS AGR I
fax : +39 39 655 53 00

name : SIEMENS AG
org : siem4
add1 : (POB 830953)
add2 : OTTO-HAHN-RING, 6
city : MUENCHEN 83
zip : D - 8000
cntry : GERMANY
tel :
telex :
fax :
```

GI   : Financial contributions
        Technology:
        The leading European IC manufacturers will develop 0.5
        and 0.3 micrometers CMOS technologies, starting from
        their respective know-how. Technological capability has
        to be demonstrated by manufacturing of competitive DRM
        (V-RAM), SRAM, EPROM and LOGIC products. Cooperation will
        concentrate on the field of the development of process
        steps, of a common equipment strategy, on manufacturing
        science as well as on definition of design standards and
        interfaces. A wider cooperation with other partners on
        specific technological aspects will be possible.

        Equipment and Materials:
        Companies and institutes being involved with this sub-
        programme   have   the task to   develop   manufacturing
        equipment and materials in strategic areas.   Cooperation
        between equipment manufacturers and the semiconductor
        industry will be supported by the tight mesh of equipment
        and process development.

        Application:
        Application industries, IC manufacturers and CAD design
        houses will cooperate in the realization of advanced
        microelectronics systems (Euro-projects) and CAD design
        systems having standardized interfaces.

        Basic and Long Term Research:
        Long term research in institutes, universities   and
        companies participating in JESSI will develop new methods
        and processes in the field of technology and design/CAD.
        Supporting   and alternative research will be   under
        orientation.

        Qualifications
        The   participating   institutes   and   companies   have
        considerable experience in their field.
```

## Agreements
A cooperation agreement has been signed between the institutes and companies participating in the Definition Phase. Cooperation agreements for the execution phase of the JESSI programme and sub-programmes are in process. Specific contracts will have to be signed between partners for each JESSI project respective sub-project.

## Markets
The world market for microelectronics will increase at an average of 14% per year until the year 2000, reaching approximately 160 billion US dollars with a 28 billion US dollar share for Europe. The three European IC makers cooperating in JESSI will aim at enhancing their positions on the European and world-wide market as well. On the other hand, on-chip system solutions will represent 50% of the IC market. The strength of the European electronic industry depends on its ability to develop such complex microelectronic circuits and to include them into systems.

## Location
The partners in each sub-programme of JESSI will carry out studies in their laboratories and plants within the European countries. Exploited Matter still to be discussed. As a general rule:
- within a specific project, the contractors will grant each other non-exclusive, non-transferable licences under the exchanged results, under favourable conditions
- other partners within the JESSI programme have the right to be granted licences and user rights against commercial conditions after a reasonable lead time.

***END OF SHOW***

## APPENDIX B: OVERVIEW OF ECHO DATABASES

The following is a list of some of the European databases that can be accessed directly from the U.S. Although not all are technical, they nevertheless provide insight into the social and economic process of European cooperation. The databases are listed in three categories: Research and Development, Language, and Industry and Economy:

## RESEARCH AND DEVELOPMENT

ARCOME      Covers the information and communication sector of Europe.

BIOREP      Biotechnological projects carried out in EC countries.

DOMIS       Directory of materials information sources.

EABS        Research sponsored by the EC in the fields of nuclear research, new sources of energy and environmental research.

EUREKA      Projects Financed under the EUREKA program.

EURISTOTE   On-line access to over 10,000 theses and studies in the areas of community policy, competition law, and European institutions.

IES-DC      (Information Exchange System – Data Collection) Information on publicly funded information technology (e.g. ESPRIT, RACE, Alvey, etc.)

TECNET      Describes demonstration projects of the EUROTECNET network.

ENREP       Directory of Environmental Research Projects in EC states.

## LANGUAGE

EURODICAUTUM   Terminology databank containing scientific and technical terms, contextual phrases and abbreviations in all European languages except Greek.

THESAURI       Analytical inventory of all current structured vocabulary which appeared in at least one of the official languages of the EC, USA and Canada.

## INDUSTRY AND ECONOMY

TED    Invitations for bid for public contracts.

JUSLETTER    Quick and concise information on European
             legislation.

ELISE    European information network in support of the  exchange
         of local employment initiatives.

MISEP    Information exchange system on unemployment measures.

PABLI    Bi-monthly blue pages by EC on progress in development
         projects.

Defense Technical Information Center*
ATTN: DTIC-FDAC
Cameron Station (Bldg 5)     (*Note: Two copies for DTIC will
Alexandria, VA  22304-6145     be sent from STINFO Office.)

Director
US Army Material Systems Analysis Actv
ATTN: DRXSY-MP
001  Aberdeen Proving Ground, MD  21005

Commander, AMC
ATTN: AMCDE-SC
5001 Eisenhower Ave.
001  Alexandria, VA  22333-0001

Commander, LABCOM
ATTN: AMSLC-CG, CD, CS (In turn)
2800 Powder Mill Road
001  Adelphi, Md  20783-1145

Commander, LABCOM
ATTN: AMSLC-CT
2800 Powder Mill Road
001  Adelphi, MD  20783-1145

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Advisory Group on Electron Devices
201 Varick Street, 9th Floor
002  New York, NY  10014-4877

Director
Naval Research Laboratory
ATTN: CODE 2627
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